Chapter 1: Prepping Graphics for Print

In This Chapter

- **Picking the right resolution, mode, and format**
- **Prepress and working with a service bureau**
- **Creating color separations**

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Preparing images for the screen is a snap compared to what you have to go through to get images ripe for the printing process. If all you ever want to do is print your images to a desktop laser or inkjet printer, the task is a little easier, but you still must take some guidelines into account. And prepping your images for offset printing? Well, throw in an additional set of guidelines. It's not rocket science, mind you. If you stick to the basic rules and, more importantly, spend some time developing a good working relationship with your service bureau and offset printer, you're good to go.

Getting the Right Resolution, Mode, and Format

If you're not familiar with the concept of resolution, I suggest taking a look at Book II, Chapter 1. That's where I cover all the basics on resolution, pixel dimension, resampling, and other related topics. For full descriptions on color modes and file formats, see Book II, Chapter 2. That said, the next few sections give you the lowdown on the proper settings for an image that will ultimately go to print.

Resolution and modes

Table 1-1 provides some guidelines on what resolution settings to use for the most common type of output. Remember these are just *guidelines*. They aren't chiseled into stone to withstand the sands of time or anything lofty like that. You need to communicate with your service bureau, offset printer, or client and get specifications and/or recommendations. (See the section, "Working with a Service Bureau," later in this chapter.)

Table 1-1 Recommended Resolutions and Image Modes

Device	*Notes*	*Recommended Resolution*	*Mode*
Fuji Frontier Photo Printer	Wallets to 10 x 15 inches. Great for printing digital photos.	300 dpi	RGB
Online Photo Printers, such as Shutterfly	Check recommended size and resolution settings on the vendor's Web site.	1024 x 768 for 4 x 6 print; 1600 x 1200 min. for 8 x 10 print	RGB
Digital presses	Brands include Xeikon, Xerox, IBM, Indigo*, Scitex, Heidelberg, and so on.	255 dpi	CMYK
Epson color inkjets	Resolutions depend on the print setting. Epson recommends ⅓ of the horizontal resolution, but do test prints; settings may be higher than you need.	720 dpi x ⅓ = 240 dpi; 1440 dpi x ⅓ = 480 dpi; 2880 dpi x ⅓ = 960 dpi	RGB or CMYK
Color separations	Film separations or direct to plate for offset printing.	2 x lines per inch (lpi); 2 x 133 lpi = 266 dpi; 2 x 150 lpi = 300 dpi; 2 x 175 lpi = 350 dpi**	CMYK and spot colors
Laser printers	Color or B&W printouts.	2 x lpi = 170 dpi	Grayscale or RGB

** Indigo presses can handle a fifth spot color if necessary.*

*** See the following section, "Screen frequencies."*

Screen frequencies

For the appropriate resolution for color separations in Table 1-1, I list the amount of 2 multiplied by the number of lines per inch. The lines per inch, or *lpi,* pertains to the screen frequency of the output device. Screen frequencies are measured in lines per inch in a halftone screen. You can also hear the terms *screen ruling* or *line screen*. When images are printed, they are converted into a series of dots called *halftones*. When you print your halftone, you print it by using a halftone screen of a certain value. The average screen frequency for printing four-color images is 133 to 175 lpi. Therefore, when you multiply that by 2, you need to create your images by using a resolution setting of 266 to 350 dots per inch (dpi).

File formats

As far as file formats go, what you choose depends on a couple of issues:

- What you intend to do with the image. Print it to a laser printer? Order prints from an online photo printer?
- What your service bureau, offset printer, client, director, or other interested parties prefer.

Table 1-2 lists some of the more popular recommended formats for specific jobs, but again, communicate with the parties involved to see what is ultimately the best format to use.

Table 1-2 Recommended File Formats

Job	*Formats*
Color inkjet printouts	EPS, TIFF, PDF, PSD
Color separations	PSD, PDF, EPS, TIFF, DCS 2.0
Spot color separations	PSD, PDF, DCS 2.0 if importing into another application
Magazines/brochures	EPS, TIFF, PDF
Newspapers	TIFF, PDF
Importing to page layout programs	TIFF, EPS, PSD, PDF
Importing to illustration programs	EPS, TIFF, DCS, PSD, PDF
Slides	TIFF, PowerPoint, PICT, PCX, EPS (some bureaus can't do EPS)
Photo prints	JPEG, TIFF
Word documents	TIFF, EPS
For e-mailing for workflow review	PDF

Working with a Service Bureau

Service bureaus provide a wide variety of services, depending on their size. Some handle photo processing and various photographic output options such as prints (of varying sizes) and slides. Mounting and lamination services may also be provided. Many service bureaus provide scanning services, including high-end drum scanning. A common service is taking scans or digital photos and burning them onto CDs or DVDs. Many service bureaus provide output to color separations to film and RC paper. Larger bureaus may even have a digital press to handle a short run (500 or less), on-demand printing need.

Some file format warnings

If you save your file as an EPS or DCS and reopen the file in Photoshop, Photoshop rasterizes the vector data to pixels. Save the original in the native PSD format.

If you save your layered file as an EPS, Photoshop converts your vector type to clipping paths. Extensive and small type creates complex clipping paths, which can be time consuming and sometimes difficult to print. You can either flatten your file or deselect the Include Vector Data option in the Save as EPS Options dialog box. Either choice rasterizes the type into pixels at the resolution of your image. You may want to consider eliminating the type in your image file and applying it either in a drawing or page layout program that can retain vector type.

Getting the ball rolling

Developing a good working relationship with your service bureau and/or offset printer can save you a lot of time, money, and frustration. These folks are the experts and know their equipment and processes. And believe me, they're only too willing to help. The fewer problems they have with your files, the better they like it. You can do some things to keep the relationship on solid footing:

- **Get a dialogue going about the specs:** If your file is going directly to a newspaper, magazine, or other publication, talk with the art director, graphics production coordinator, or other knowledgeable person about the graphic specifications required. Different service bureaus and offset printers accept files from different applications and files of various formats.
- **Build a lasting relationship:** Consistency is also key. When you find a good bureau or offset printer, stick with it for all your jobs. Jumping from one company to another because a quote came in a little cheaper doesn't always pay off in the long run. If you're a faithful customer, often your service bureau or offset printer will match that lower quote if it can. You don't want to have to relearn what a new company can and can't do and vice versa. And if possible, try to let one company handle your entire job. That way, one company controls the quality from beginning to end, with no finger-pointing if things go bad.
- **Get on the Web:** Many service bureaus have Web sites where you can find a listing of services they offer, price lists, file specs, and even downloadable order forms. Larger offset printers also have Web sites offering general information and online requests for quote applications. Larger offset printers may provide services such as scanning and film-separation output, so be sure to check the Web site for details.

Using a prepress checklist

In addition to communicating with your offset printers and service bureau, you need to do some additional work to prepare your file for print. Here is a handy checklist that you can use whenever you're prepping a file for print. Use it to ensure your file is ready and rarin' for problem-free output. Note that this list isn't all-inclusive when it comes to prepress; I include tips that pertain to Photoshop only.

- **Always transform your images in their native application.** Size, crop, rotate, shear, and reflect art in Photoshop. Transforming images in an illustration or page layout program is complex and can cause the RIP (raster image processing, which converts objects to a series of dots/pixels for printing) to take a long time to process the file.
- **Ensure that images can first print from Photoshop.** Do this before importing the images into an illustration or page layout program.
- **If you're placing Photoshop EPS images into a page layout or illustration program, set the halftone screen frequency in the destination program instead of embedding it in each image in Photoshop.** Or better yet, don't set any halftone screen frequencies in your images and let your service bureau or offset printer handle setting them in the other program.
- **When saving Photoshop images for print purposes, stick to TIFF, EPS, native PSD, or PDF file formats.** If you're unsure of the proper format to use for a specific job, ask your offset printer or service bureau for recommendations.
- **Make sure that you have used the proper color mode.** For example, use CMYK for color separations and RGB for slide output. Again, if you're not sure, ask your offset printer or service bureau for recommendations.
- **Create vector shapes and paths efficiently.** Printing vector art involves using intense calculations for every anchor point, and overly complex paths can cause problems during the RIP process. Use the fewest number of anchor points possible to create the path and delete any unnecessary or stray points. Leave your flatness setting blank. Photoshop uses the default setting for the output device, which is usually a safe bet.
- **Limit the number of typefaces.** Downloading takes time. Limiting the number of typefaces also makes your document look more sophisticated and polished. It is also a good idea to use good quality fonts from established foundries.
- **Make sure that all scanning is at the appropriate dpi.** As a general rule, 2 multiplied by the line screen (lines per inch or lpi) equals the dpi to use in scanning the images. If you need to resize your image, be sure to scan it at a higher resolution accordingly. For example, if you need it twice as big, scan it at twice the final resolution needed. When scanning line art, scan at a resolution of 1200 dpi or so to ensure a better black-and-white image.

- **If your image is to bleed (extend to the edge of the printed page), take that into account when creating your image.** Note that you need to allow for ⅛ to ¼ of an inch on any side that will bleed to allow for slippages when the paper is cut.
- **Always specify colors from a Pantone color swatch chart and then select the color, whether process or spot, in Photoshop.** *Never* trust the way colors look on-screen because of calibration deficiencies and differences between RGB and CMYK color models.
- **Make spot color names consistent.** Make sure that the Photoshop spot color names exactly match those of any programs to which you are importing your image, such as an illustration or page layout program. Otherwise, you may get an additional color separation.
- **Print and provide laser prints of your file, both separations (if warranted), and a composite print.** Print all with printer marks — crop marks, registration marks, labels, and so on.
- **Provide all fonts used in your file.** Provide both screen and PostScript printer fonts, if applicable.
- **Choose File➪Save As for your final save to squeeze down to the smallest file size.** Doing a Save As compresses your file as small as possible.
- **Organize your files into folders.** For example, put the image files together in one folder, all the fonts in another, and so on. Practice good file management and organization.
- **Communicate any trapping needs to your service bureau or offset printer.** For color separations, indicate whether you have created the trapping yourself or if you want the service bureau/offset printer to do it.

Saving and Printing Vector Data in a Raster File

Photoshop allows you to create vector shapes and vector type with the pen tools, shape tools, and type tools (I explain how in Book III). Technically, the vector shapes are clipping paths applied to a bitmap, or *raster,* layer. But the clipping path is *still* a vector path, thereby retaining vector qualities. This vector data is resolution independent, which means that it prints at the resolution of the PostScript output device. Photoshop sends the printer separate images for each type and shape layer, which are printed on top of the raster image and clipped by using their vector paths. The edges of the vector path print at the full resolution of the PostScript printer, but the contents, such as the colored pixels or the image pixels within the vector path, print at the resolution of the Photoshop file (all portions of the type are resolution independent). Therefore, type and shapes always have crisp, hard edges, with curves appearing smooth and never jagged.

Remember that the only file formats that allow you to retain vector data are PSD, PDF, DCS, and EPS. When saving to DCS or EPS, be sure to select the Include Vector Data option in their respective Options dialog boxes. All other file formats rasterize the vector data.

Choosing Color Management Print Options

I highly recommend checking out the color management section in Book II, Chapter 3. There I go into great detail on the concept of color spaces, ICC profiles, and so on. Here, I cover the color management options you find in the Print with Preview dialog box.

Different output devices operate in different color spaces. Monitors, desktop printers, large format printers, film recorders, offset printers, and so on all have their own unique color space. The color management options enable you to convert the color space of your image while printing. So, for example, if the ICC (color) profile of your image is sRGB, you can choose to have your image's color space converted to the color space of your Epson printer when you print.

Unfortunately, I can't tell you what specific settings to choose. This choice is a widely debated topic, and different printers have their strengths, shortcomings, and quirks. Some experts say to let your printer, especially if it is a prosumer or professional-level printer, determine the colors, while others say to let Photoshop handle the duties. My advice is to take an hour and a pack of paper, run test prints to see which settings give you the most accurate result, and stick with those. Try different color spaces for both Source and Print Spaces and compare the printouts. You may even get different results from different types of paper.

When you have some free time, the following steps can help you experiment with the Color Management settings and discover what print settings work best:

1. **Choose File➪Print to open the Print dialog box, shown in Figure 1-1.**
2. **Choose Color Management from the pop-up menu in the top right of the Print dialog box.**
3. **In the Print area, choose either Document or Proof.**

   Remember you're experimenting. So choose one, and then try the other.

   - **Document** uses the color profile of your image.
   - **Proof** by default uses the color profile of your Working CMYK color space, which you defined in your Color Settings dialog box. You can change this profile, however, by choosing Current Custom Setup

from the Proof Setup Preset menu in the Options area. You can define this custom option by first going to View➪Proof Setup. For details on proofs, see Book II, Chapter 3.

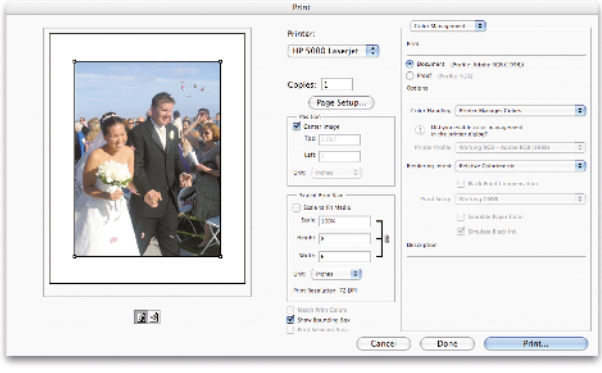

Figure 1-1: Be sure and specify the settings in the Color Management portion of the Print dialog box.

4. **In the Options area, choose a method of Color Handling.**

   The options differ depending on whether you chose Document or Proof in Step 3.

   If you chose Document in the Print area, here are your options:

   - **Printer Manages Colors** sends the document unchanged to the printer, tagged with its color profile. The printer driver then picks an appropriate color profile and converts your document's colors to the final printout. Just make sure you enable color management in your printer dialog box.
   - **Photoshop Manages Colors** tells Photoshop to handle the color conversion, using the settings you choose from the Printer Profile and Rendering Intent pop-up menus. Photoshop also checks whether or not you selected the Black Point Compensation option with this setting. If so, make sure you disable any color management in your printer dialog box.
   - Choose **Separations** if you want to print color separations (see the upcoming section).
   - Choose **No Color Management** and no conversion occurs.

   If you chose Proof in the Print area, you see the same options, but they produce different results:

- **Printer Manages Colors** works only with a Postscript (PS level 2 or higher) printer, which manages the color conversion of the proof to the print based on your selection of Simulate Paper Color or Simulate Black Ink.
- **Photoshop Manages Colors** tells Photoshop to handle the color conversion of the proof to the print, using the printer profile specified in the pop-up menu and your choice of simulation. Unless you have a lot of dark colors, I recommend leaving it on Simulate Paper Color.

5. **If you chose Photoshop Manages Colors, choose your printer and paper type from the Printer Profile pop-up menu.**

Although you may be able to change the Rendering Intent setting, I recommend leaving this at the default setting of Relative Colorimetric. Also leave the Black Point Compensation check box at the default setting of checked or unchecked (depending on your Color Handling choice) — unless, of course, you're a color guru and have a better reason not to.

6. **Unless you haven't set your CMYK working space yet, you can leave Proof Setup Preset as is. To set the working space, see Book II, Chapter 3.**

   Proof Setup Preset reflects the working CMYK space you established in your Color Settings dialog box, along with any custom presets you specified in the View➪Proof Setup➪Custom dialog box.

7. **When you finish making your selections, click Print.**

   That's all there is to it. If you want more information on printing, check out Book I, Chapter 3. For more explanation on color management, see Book II, Chapter 3.

If all you want to do is print color prints on your desktop printer, I recommend starting off by choosing Document in the Print area and choosing Photoshop Manages Colors for Color Handling. If you have a little time and paper to burn, then print another copy by using Printer Manages Colors for Color Space. Do a side-by-side comparison to see which one looks superior. You can also crack the seal on the documentation that came with your printer for any recommendations.

Getting Four-Color Separations

It is necessary to *color separate* your image whenever you plan to print your image to an offset press. Your image must first be in CMYK color mode (choose Image➪Mode➪CMYK Color). Then the composite color image gets

digitally separated into the four-color channels — cyan, magenta, yellow, and black — and is output. (These colors are also known as *process colors*.) Sometimes, the separation output is onto film, and sometimes, it is output directly to aluminum printing plates. The plates are put on an offset press, paper runs through each of the four inked rollers (cyan first, then magenta, yellow, and finally black), and out comes your composite image.

Getting laser separations

Before you take your image to a service bureau or offset printer to get color separations, it is wise to get what are called *laser separations*. Basically, you are color separating your image, not to film or plates, but to paper.

If your image doesn't separate to paper, most likely it won't to film or plates, either. You can go back and correct the problem, rather than pay upwards of $80 to $150 an hour to have the service bureau or offset printer correct it for you. Consider laser separations a cheap insurance policy.

Follow these steps to get laser separations from your desktop printer:

1. **Be sure your image mode is CMYK. If it isn't, choose Image➪Mode➪CMYK Color.**

   I'm assuming your image is a four-color image. But it may also be a grayscale, duotone, tritone, or quadtone image, in which case no conversion to CMYK is necessary. (See Book II, Chapter 2, for more on modes.)

   If you're new to converting RGB images to CMYK, don't be surprised if your vibrant colors turn muddy and flat. This is because the *gamut,* a fancy word for range of color, for CMYK is much smaller than it is for RGB, and Photoshop converts colors that are out of the CMYK gamut to their closest match. It's a cold, harsh fact that we all have to live with. After the conversion, you have an image with four channels — Cyan, Magenta, Yellow, and Black, like the one shown in Figure 1-2.

2. **Choose File➪Print. In the Print dialog box, select Color Management from the pop-up menu in the top right of the Print dialog box.**

3. **In the Print area, select Document.**

   It should say U.S. Web Coated (SWOP) v2.

4. **Select Separations from the Color Handling pop-up menu.**

   This option prints each channel from the image to a separate plate, or in the case of laser separations, paper.

5. **Select Output from the pop-up menu in the top right of the Print dialog box, as shown in Figure 1-3. Then select additional options as you desire.**

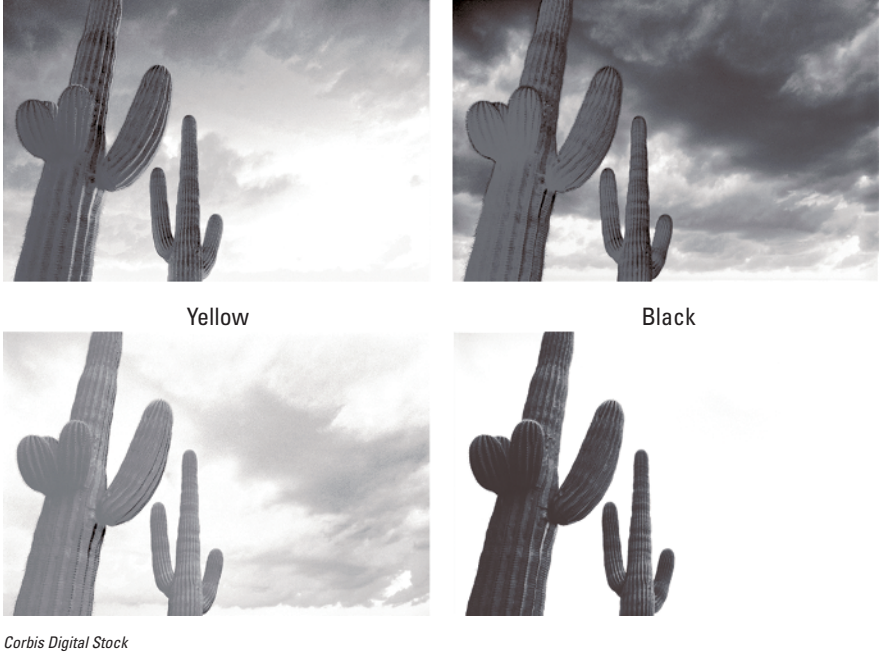

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Figure 1-2: Color images are separated into four process colors — cyan, magenta, yellow and black.

Figure 1-3: When printing color separations, be sure and check the necessary options in the Output section of the Print dialog box.

For general print options, see Book I, Chapter 3. For additional options, see Table 1-3.

Note that if you're printing to a non-PostScript printer, some of these options may not be available. You see a preview of most of these options as you apply them to your file.

6. **Click the Print button.**

   If all goes well, four pieces of paper, one for each of the four CMYK channels, prints. If you're printing a grayscale, duotone, tritone, or quadtone image, you get one to four pieces of paper, one for each color used. If that doesn't happen, something's amiss, and it's time for troubleshooting. Be sure to take these laser separations with you when you hand over your file to the service bureau or offset printer.

Table 1-3 Output Options

Option	*What It Does*	*Recommendation*
Screen	Creates a custom halftone screen by changing the size, angle, and shape of the halftone dots.	Leave this set to Use Printer's Default Screen. Let the service bureau or offset printer change it if necessary.
Transfer	Redistributes brightness levels in your image.	I wouldn't mess with this setting unless you're a prepress professional.
Interpolation	Anti-aliases low-resolution images by resampling.	Available only for PostScript Level 2 or laser printers. Leave it deselected.

Option	What It Does	Recommendation
Calibration Bars	Prints an 11-step grayscale bar outside the image area to gauge how accurately the shades are being printed. When printing separations, this option prints a gradient tint bar and color bar.	Select this option.
Registration Marks	Prints crosshair and target marks outside the image area, allowing you to line up the four plates or pages.	Select this option.
Corner Crop Marks	Adds crops marks at the corners of the image to indicate where to trim the image.	Select this option.
Center Crop Marks	Adds crop marks at the center of each side of the image to indicate where to trim the image.	Select this option.
Labels	Prints the filename and channel name on each plate or page.	Select this option.
Emulsion Down	*Emulsion* is the side of the film that is light sensitive. Allows the film to be printed with the emulsion side down.	Leave this option deselected for laser separations. When the service bureau or offset printer prints the separations to film or plates, it may select this option.
Negative	Prints black as white and white as black, and every other color inverts accordingly.	Leave this option deselected for laser separations. When the service bureau or offset printer prints the separations to film or plates, it may select this option.
Include Vector Data	See the "Saving and Printing Vector Data in a Raster File" section, earlier in this chapter.	Leave this option selected if you have type or vector paths.
Encoding	This option specifies the method of encoding used to send the image to the printer.	Leave this option at the default of Binary.

Creating Spot Color Separations

Photoshop allows you to add separate channels for spot colors (see Book VI, Chapter 1, for more on channels), which can then be color separated. Spot, or *custom,* colors are premixed inks manufactured by various ink companies, the most popular in the U.S. being Pantone. A spot color is often used for a logo, type, or small illustration. Spot colors are also used when you need to apply metallic inks or varnishes to your print job. Spot colors can be used instead of, or in addition to, the four process CMYK colors.

If you are delving into the world of spot colors, I highly recommend that you choose your color from a printed Pantone swatch book, available from www.pantone.com. Because your screen is an RGB device and you're setting up your file for a CMYK output device, the colors you see on-screen do not match the colors that are ultimately on paper and at best are a ballpark match. For accuracy, you must select the colors from the printed swatch book. For more on working with color, see Book II, Chapter 3.

Creating a spot channel

Follow these steps to create a spot channel:

1. **Create the graphic or type to which you want to apply the spot color on a separate layer.**
2. **Ctrl+click (⌘+click on the Mac) on the thumbnail of the layer to select the graphic and then fill it with any solid color and an opacity of 100 percent.**
3. **With your selection active, choose Window➪Channels, and choose New Spot Channel from the Channels palette pop-up menu.**

   You can apply a spot color only to an active selection. It can't be applied just to a layer.

   The New Spot Channel dialog box appears, as shown in Figure 1-4.

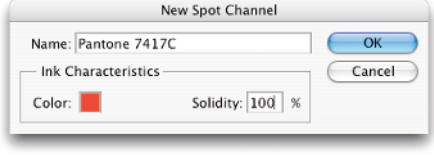

Figure 1-4: Adding an additional color separation in Photoshop requires creating a spot color channel first.

4. **In the Name text box, enter a name for your spot color. In the Ink Characteristics area, click the color swatch.**

   I recommend naming it according to the spot color you want to use, such as Pantone 7417C.

   When you click the color swatch, the Color Picker appears.

5. **Click the Color Libraries button in the Color Picker and select your Pantone color from the Color Libraries dialog box that appears (see Figure 1-5). Then click OK.**

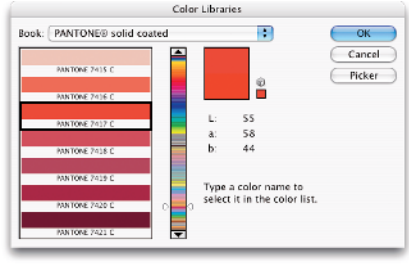

Figure 1-5: Select an appropriate color from the Color Libraries dialog box

6. **In the New Spot Channel dialog box, select a Solidity value between 0 percent to 100 percent.**

   A value of 100 percent represents an ink that is completely opaque, such as a metallic ink, which completely covers the inks beneath it. A value of 0 percent represents a transparent ink, such as a clear varnish. But the solidity value affects only the *screen* view and *composite* prints; it doesn't affect the separations. It can be helpful to see where a "clear" varnish will print.

7. **Click OK to close the dialog box.**

   Your spot channel appears in the Channels palette and is filled in the image as well. I created a spot channel for my crest graphic and for the sushiko type (Pantone 7417C), as shown in Figure 1-6.

   In the printing process, spot colors are overprinted on top of the four-color image, as shown in Figure 1-7. That means that the spot color is applied at the end of the printing process and is printed over the other inks. This can sometimes cause lighter spot colors to darken somewhat.

   If you need your spot color graphic to *knock out* the underlying image, create it in an illustration or page layout program. A knockout is when a hole is left in the four-color image, and the spot ink then fills that hole. It does not print over the other inks.

8. **Save the image in the native Photoshop, Photoshop PDF, or Photoshop DCS 2.0 (Desktop Color Separations) format.**

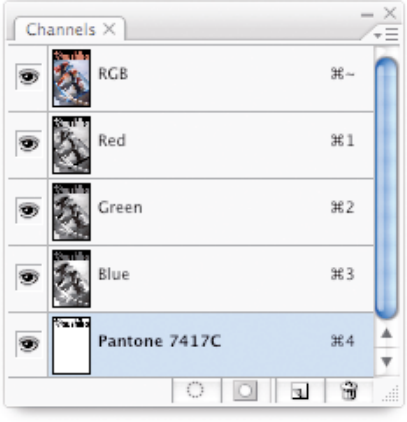

Figure 1-6: The Channels palette displays the spot channel.

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Figure 1-7: Spot colors are often used for color critical logos that print on top of your image.

If the image is being separated directly out of Photoshop, leave it as a PSD or PDF file. If you want to import it into a different program, such as PageMaker, InDesign, or QuarkXPress, you must save it as a DCS file. You also have to go through a few more hoops: If your image is a duotone, tritone, or quadtone image, you must first convert it to multichannel mode with the Image➪Mode command.

In the DCS 2.0 Format dialog box, make sure that the Include Halftone Screen and Include Transfer options are not selected.

Import the image into your destination application and set your screen angles.

Editing a spot channel

After you create a spot channel, you can edit it. Select the channel in the Channels palette and use a painting or editing tool to paint with black, white, or any shade of gray, just as you would with an alpha channel. To change any of the options of the spot channel, double-click the spot channel thumbnail, or select it and choose Channel Options from the palette pop-up menu. Choose a different color or solidity.

Converting an alpha channel to a spot channel

If you want to convert an alpha channel to a spot channel, select the alpha channel in the Channels palette and choose Channel Options from the palette pop-up menu. Rename the channel and select Spot Color. Choose a color from the Custom section of the Color Picker. Click OK. Note that Photoshop converts all areas containing nonwhite pixels (unselected to partially selected areas) to the spot color. Choose Image➪Adjustments➪Invert to apply the spot color to the white pixels or selected areas of the alpha channel. For details on alpha channels, see Book VI, Chapters 1 and 3.